APPENDIX.

Description of new forms of British East African butterflies in the Hope Department, Oxford University Museum, chiefly collected by the Rev. K. St. Aubyn Rogers, M.A., F.E.S. By Roland Trimen, Hon. M.A. Oxon., F.R.S., F.E.S., &c.

Family NYMPHALIDÆ.

Sub-family *ACRÆINÆ*.

Acræa asboloplintha, Karsch,* *sub-sp. nov., rubescens.*

Exp. al. (4 ♂) 2″ 1—2‴; (1 ♀) 2″ 1‴.

♂. *Fore-wing*: fuscous ground of a clearer, less brownish but more ashy, tint than in typical form; black spots larger and more distinct; inner-marginal rufous, usually present in *asboloplintha* as a more or less obscure stripe from before middle to near posterior angle, is extended upward so as to form a median band, variable in development, and ill-defined on its edges, but intruding on discoidal cell and more or less filling space between sub-basal and medio-discal black spots. *Hind-wing*: deeper and brighter rufous; all medio-discal black spots—especially spots 1–4—larger, well-defined; hind-marginal fuscous edging much broader, its inner side not sharply defined but more or less diffused. Under side.—*Fore-wing*: rufous space of upper-side represented by a reddish tinge occupying a corresponding area; black spots more distinct and rather larger than in typical form. *Hind-wing*: black spots all larger; basal and inner-marginal red border more vivid, bright crimson; broad discal-submarginal fulvous band immediately beyond medio-discal black spots much deeper and brighter in colour; narrow hind-marginal yellow border also brighter.

Abdomen with much less rufous-ochreous on its terminal half, segments 4 to 9 being dorsally and laterally black, with a conspicuous upper-lateral series of ochre-yellow spots.

♀. *Dull-whitish* replaces in both wings the rufous of the

* Ent. Nachr., xx, p. 223 (1894).

♂; black spots as in ♂. *Forewing*: fuscous area duller and with a brownish tinge. *Hind-wing*: a very broad brownish-fuscous hind-marginal border, very diffused on its inner side. UNDER SIDE.—Very much duller and paler than in ♂ throughout, and but little differing from that of typical form ♀, except that median inner-marginal space in fore-wing is of a decidedly paler tint, in accordance with whitish area on upper side.

It is not improbable that the single ♀ of *rubescens* here described is not the normal form of that sex, but a second form of the kind not unfrequent in the genus, where white or whitish more or less suffuses or takes the place of the ordinary red or fulvous ground colour, usually in the hind-wing only.* The normal ♀ will probably be found to resemble the ♀ *asboloplintha* (which is of much duller and fainter colouring than the ♂), except as regards on the upper side a more rufous hind-wing, and a rufous median space in the fore-wing.

The ♂ *rubescens* obviously stands in much the same relation to ♂ *asboloplintha* as *A. acara*, Hewits., does to *A. zetes*, Linn., *A. cepheus*, Linn., to *A. eginopsis*, Auriv., *A. natalica*, Boisd., to *A. pseudegina*, Westw., and *A. areca*, Mab., to *A. egina*, Cram., *vid.*: that of generally brighter colouring and especially of rufous ground colour in the fore-wing instead of fuscous. This relation is associated with a different geographical range in the cases mentioned, the brighter forms being in three instances East and South-East, and the obscurer West African, linking gradations occurring in the intermediate areas; but *rubescens* and *asboloplintha* are found side by side in British East Africa, as are also *areca* and *egina* in Nyassaland.†

The isolated position, as sole representative of a sub-group of his second group of the genus *Acræa*, assigned to *A. asboloplintha* by Aurivillius,‡ does not seem to me to be a natural one, its respective neighbours assigned on either side being *A. satis*, Ward, the last species in sub-

* In a striking variety (*A. pseudolycia*, Butl.) from Congo and Angola of *A. acara*, Boisd., the entire field of both wings—except an ill-defined yellow-ochreous band just before hind-marginal black border of fore-wing, is pure white in both sexes. *A. albo-radiata*, Auriv., the very close Zambesian ally of *A. anemosa*, Hewits., also presents in both sexes some broad pure-white sub-apical rays in the fore-wing, and a large pure-white discal space in the hind-wing.

† Aurivillius, "Rhop. Æthiop.," pp. 508–10 (1899).

‡ *Op. cit.*, p. 90.

group II, and *A. zetes*, Linn., the first species in sub-group IV. I consider that, notwithstanding the extreme attenuation of the upper side hind-marginal border of the hind-wing, the disposition of the spots throughout, and also the broad unspotted fulvous discal-submarginal band of the hind-wing under side—though this feature is developed with exceptional prominence,—bring this form into much closer approximation to *A. stenobœa*, Wallengr., and in a less degree to *A. aglaonice*, Westw., and *A. caldarena*, Hewits.

The new sub-species *rubescens* here described inhabits British East Africa, and the 6 ♂ and 1 ♀ in the Hope Department of the Oxford University Museum, all bear the following data, viz. "About 6000 ft., 15 m. W. of Ft. Hall, Kikuyu Co., Weithaga, capt. and pres. 1907, by K. St. A. Rogers." The tickets further note the dates of capture, *vid.*: of the 6 ♂, Aug. 15, 1906, Feb. 15th and 22nd, and March 12th, 15th and 25th, and of the ♀, March 15th, 1907.

Type of male captured March 12, 1907, of female captured March 15th, 1907, both from Weithaga, in the Hope Department, Oxford University Museum.

Specimens of typical *asboloplintha* in the same Museum bear records of capture in the Tiriki Hills, 20 m. N. of Kisumu (C. A. Wiggins) and on W. shore of Victoria Nyanza, 60 m. along Anglo-German boundary, (1° S. Lat.) (Captain T. T. Behrens, R.E.), all dated as taken in March 1903; and others, in my collection, were captured by Mr. C. W. Hobley at Kaimosi and Nandi on different days during February and March, 1903.

Sub-family *NYMPHALINÆ.*

Pseudacræa rogersi, sp. nov.

A near ally of *P. eurytus*, Linn. (*hirce*, Drury).

Exp. al. (♂) 1″ 7‴; (♀) 3″ 1 ‴.

♂. *Fuscous, with yellowish-rufous areas, with black basal and sub-basal spots, and black nervules and internervular rays. Fore-wing*: black spots of the usual number, size, and arrangement; apical area not so dark as rest of ground colour, slightly suffused with grey; sub-apical rufous bar more median than in *eurytus*, considerably broader and longer, not straight but markedly incurved

inferiorly, extending from costal nervure to 1st median nervule where its termination is much narrowed ; on its inner edge this bar anteriorly includes the upper angulated corner of discoidal cell, but is considerably indented at origin of 3rd median nervule; inner-marginal rufous space extends much nearer to base than in *curytus* and up to median nervure, but is much reduced superiorly, rising only a little above first median nervule ; black internervular rays more apparent in apical area owing to the slight greyish suffusion. *Hind-wing* : rufous area greatly enlarged, occupying all the field except a moderately broad inwardly somewhat diffuse fuscous hind-marginal border of almost even width but slightly wider towards anal angle, and a narrow costal ashy-fuscous border from base to about middle; internervular black rays penetrating rufous field much less developed than in *curytus,* becoming very finely linear at a little distance from inner edge of fuscous border. UNDER SIDE.—Very dull and very much paler ; fulvous markings of upper side appearing as faint ochrey-yellowish in fore-wing and as dull-whitish in hind-wing, exteriorly ill-defined ; apical-hind-marginal areas brownish, in fore-wing clouded with whitish-grey, with the blackened nervules and internervular rays more linear than on upper side ; black spots of basal areas conspicuous. *Fore-wing* : discoidal cell grey, but narrow space of ground colour between sub-apical bar and inner-marginal marking pale fuscous. *Hind-wing* : basi-costal border much widened (but not diffuse and ill-defined as in *curytus*), reddish-brown.

♀. *Fuscous ground darker than in* ♂, *almost black; fulvous markings of* ♂ *replaced by pure white ones. Fore-wing* : sub-apical bar straighter and broader than in ♂, but a little shorter—its lowermost spot being reduced by about half, so that it terminates about midway between 1st and 2nd median nervules ; the inner edge of this bar does not at all encroach on discoidal cell, but it emits a rather acute dentation between lower radial and first median nervules; inner-marginal white space very much reduced in comparison with the corresponding rufous marking in ♂, except just along inner-marginal edge, scarcely rising to first median nervule, beginning far from base, and with its outline diffuse and ill-defined. *Hind-wing* : hind-marginal border broader and more even than in ♂ ; internervular black rays more strongly marked. UNDER SIDE.

—Ground colour much darker; white markings of upper side conspicuously reproduced; internervular black rays better developed. *Hind-wing*: basi-costal border fulvous.

Type of male from 16 miles west of Shimba, near Mombasa, about 1200 ft. Type of female from Rabai, July 28, 1906. The above description was made from these two specimens in the collection of the Hope Department of the Oxford University Museum.

The differences from the West African *Pseudacræa eurytus*, L., presented by this interesting new congener consist mainly in the reversal in the fore-wing of the relative development of the sub-apical bar and the inner-marginal patch, and in the very much greater development of the central patch in the hind-wing. There can, I think, be no doubt that these features indicate very clearly the mimetic approximation of the just-described East African ally of *eurytus* to the common Acræine, *Planema montana*, Butler,* of the same region. *Ps. eurytus*, as is well known, mimics to perfection the abundant *Planema epœa*, Cram. (*gea*, Fab.), of Western Africa, reproducing in each sex the narrow sub-apical bar and high truncated inner-marginal patch of the fore-wings, and the narrow sub-basal patch of the hind-wings, with much exactness both in form and colour. *Ps. rogersi* ♂ has not attained the same close imitation as far as the fore-wing markings are concerned, the retention of an inner-marginal patch diminishing the likeness to *Pl. montana* which has undoubtedly been gained by the quite peculiar position, curvature, prolongation, and inner indentation of the sub-apical bar; but it is very noticeable that—as in many other cases of mimicry—the ♀ *rogersi* has proceeded further on the mimetic path, the inner-marginal patch in the fore-wings having reached almost as reduced and evanescent a stage as in the ♀ *Pseudacræa imitator*, Trim., in her simulation of *Planema aganice*.

The members of the *eurytus*-group of *Pseudacræa* stand out most prominently among mimetic butterflies in the

* Aurivillius (Rhop. Æthiop., 1899, p. 121) has treated this form as a Variety of the South African *Planema aganice*, Hewits.; but, considering how very closely allied most of the recognised species of *Planema* are, it seems better to hold it entitled to species rank, because of the much broader bands in both wings—especially in the ♂, where they are moreover of a warm fulvous instead of yellowish or yellowish-white; in this sex also the basal area on the upper side of the hind-wing is strongly red-tinged.

persistency, exactness, and completeness with which they reproduce the pattern and colouring of their models, the very variable and abundant *Planemæ*—the species of which, though few in number in comparison with the allied *Acrææ*, are very difficult to distinguish satisfactorily. Every variation in both sexes appears to be faithfully copied throughout tropical and sub-tropical Africa wherever the genus *Planema* prevails. Aurivillius (Rhop. Æthiop., pp. 530–1) has recorded eight instances in which this mimicry is palpable, and the case here noted is an addition to that list. The mimicry mentioned by Mr. S. A. Neave (Novit. Zool., xi, p. 333, 1904) of the British East African form of *Planema tellus*, Auriv., by *Pseudacræa terra*, Neave, —captured on the same day at Entebbe—is another recorded instance; and, looking to the rather dull and unattractive aspect of these butterflies, and to the evident comparative rarity of the *Pseudacrææ*, it may reasonably be conjectured that they have not been very assiduously observed or collected, and that the extension of field research will bring to light more mimicries between members of these two genera.

It is a pleasure to name the species here described after the author of the very interesting memoir to which this is an appendix, not only in recognition of his valuable services to African entomology, but in view of his having himself (see above, pp. 508 and 523) pointed out the mimetic relation existing between this *Pseudacræa* and *Planema montana*. Mr. St. Aubyn Rogers has recorded that the ♂ of the *Pseudacræa* was sent to him from Shimba ("16 miles W. of; about 1,200 ft."), while the ♀ was captured by himself at "Rabai, 14 m. N.W. of Mombasa, on July 28, 1906."

Pseudacræa trimenii, Butler.*

The intimate alliance of this form of *Pseudacræa* with the West African *P. boisduvalii*, Doubl., was recognised by me in 1869 (Trans. Linn. Soc. Lond., xxvi, p. 517), and afterwards better explained with the aid of fuller material in 1887 and 1889 (S. Afr. Butt., I, p. 298, and III, p. 405). I showed how closely in both sexes *trimenii*, the South-Eastern form, copied *Acræa acara*, Hewits., of the same region, just as *boisduvalii* mimicked the West African

* Ent. M. Mag., xi, p. 57 (1874).

Acræa zetes, Linn.* I also pointed out, how variable *trimenii* was in one important feature of its mimicry of *acara*, *vid.*: the sub-apical yellow-ochreous bar of the fore-wing, the gradation extending to its complete disappearance in some individuals (*P. colvillei*, Butler), and so far approximating to *P. boisduvalii*, but at the same time exhibiting no abatement in the distinctive feature of bright-red instead of fuscous ground colour in the fore-wing. Later on, in 1898, in the fine collection generously presented to me by my friend Mr. Cecil N. Barker, I found 2 ♀ *trimenii*, having the yellow-ochreous bar of the fore-wing only narrowly developed and mixed with white, but also exhibiting a fuscous suffusion (considerably darker in one example), so that the usual red of the fore-wing only appears near the base. This fuscous clouding gives these examples considerable resemblance to the ♂ *boisduvalii*, but it must be noted that the reduced red of the fore-wing is near the base, not near the posterior angle as in *boisduvalii*.

I am now able, through the kindness of my friend Prof. Poulton, to record the occurrence in a British East African series in the Hope Department of 10 ♂ and 1 ♀ (see the table on p. 527), of a ♂ *trimenii* from "Rabai, near Mombasa (K. St. A. Rogers) captured January 19th, 1907," in which the sub-apical bar of fore-wing is very much reduced and narrowed (while the red spots in the hind-marginal border of hind-wing are unusually large),—having the fore-wing fuscous suffusion largely developed, so that the usual red ground colour is obliterated except for a large sub-quadrate space at posterior angle as in *P. boisduvalii*, and a slight sub-basal trace. This example is a most distinctly intermediate link between the Western and Eastern forms under notice, and probably indicates another of the now rather numerous cases in which presumed distinct species of

* Haase (Untersuch. über die Mimicry, etc., 1893, p. 43, taf. 4, ff. 26–28) showed that *boisduvalii* mimicked *A. egina*, Cram., more closely than *A. zetes*, at any rate as far as the ♂ is concerned, that sex having a red patch along outer portion of inner margin of fore-wing, just as in *egina* ♂, and larger than is exhibited by *zetes* ♂, while in hind-wing larger black spots characterise both *egina* and *boisduvalii*. On the other hand, as regards the presence of red spots in the hind-marginal border of hind-wing, *boisduvalii* resembles *zetes* and not *egina*. It is noticeable also that in the feature last mentioned, the mimicking West African *Papilio ridleyanus*, White, similarly resembles *zetes* more than *egina*.

African butterflies are found to meet and intergrade in the Eastern equatorial belt.

The known range of *P. trimenii* is now a wide one, extending from Port Natal along the East Coast to Mombasa, and thence inland to "Taveta (K. St. A. Rogers), captured December 2nd, 1905" [♂ in Hope Department], and Kibwezi (C. W. Hobley) captured in April 1907.

Family PAPILIONIDÆ.

Sub-family *PAPILIONINÆ.*

Papilio dardanus, Brown, sub-sp. *tibullus,* Kirby, ♀ form. nov. *dorippoides.*

Exp. al. 3″ 8‴ (one example).*

Nearest to the ♀ form *trophonius,* Westw., *but with the warm-fulvous colouring of both fore- and hind-wings greatly extended,* causing a correspondingly large reduction and obsolescence of usual fuscous area in fore-wing, and a similar but less pronounced condition of the hind-marginal fuscous border in hind-wing. *Fore-wing*: fuscous restricted

* This expanse is decidedly greater than that attained by Kikuyu examples of the sub-species *polytrophus,* Jord., that I have measured, which vary (♂) from 2″ 10‴ to 3″ 5‴, and (♀) from 3″ 2‴–5‴. In size the new ♀ form *dorippoides* thus more approaches that of the Eastern sub-species *tibullus,* and of the Southern sub-species *cenea,* in which both sexes have an expanse varying from 3″ 7‴ to 4″ 3‴. Typical *P. dardanus* from West Coast is larger than any of its sub-species, both sexes expanding from 4″ to 4″ 6‴;—one very large ♂ from Fernando Po (with extremely wide black border to the fore-wings) attaining an expanse of 5″.

[I think that the sub-species is the Eastern *tibullus,* Kirby, and not *polytrophus.* The latter is found at the higher elevations. The two Nairobi specimens (about 5500 ft.), represented on Plate XXVIII, Figs. 6 and 7, are also much larger than *polytrophus,* while the male (Fig. 7) has the black hind-wing band of *tibullus* and not that of the former sub-species. It is probable that in the Nairobi district *tibullus* occurs at the lower elevation—about 5000–6500 ft., while *polytrophus* captured by Doherty is labelled 6500–9000 ft. There is little doubt that the two areas overlap, and that the two sub-species meet and freely interbreed; furthermore that the resemblance of *dorippoides* to specimens of *polytrophus* is to be explained thereby.

Since the above note was written, Mr. Rogers has informed me that a *trimeni* female form recently taken by him at Nairobi, belongs, he believes, to the large *tibullus* sub-species rather than the small *polytrophus.* E. B. P.]

to (1) a costal border, rather narrow and dark as far as end of discoidal cell, but expanding (with a considerable irroration of fulvous scales) from a little beyond cell to apex into a rather wide form, inferiorly bounded by fifth sub-costal nervule; (2) a very attenuated faintly marked hind-marginal edging, expanding to enclose the two very much enlarged spots of the ground colour between 3rd and 1st median nervules; and (3) a little sparse extra-cellular irroration indicating the position of the usual broad band separating sub-apical oblique bar (which is normally white, but sometimes fulvous as in the example under description, in the *trophonius*-form) from large patch occupying inner-marginal area;—also some sparse fuscous irroration about base and over basal two-thirds of cell; with the exception of the retention on costa of the pale yellowish and whitish origins of usual oblique disco-cellular streak and extra-cellular sub-apical bar, all the rest of the wing is occupied by warm-fulvous—the two markings just mentioned being much enlarged, and, except as regards their costal portions, completely merged and confluent with each other and with the general fulvous area. *Hind-wing*: costal border pale yellowish shading into fulvous field a little below sub-costal nervure and its 1st nervule; hind-marginal border unmixed fuscous only between apex and radial nervule, the rest being closely irrorated with fulvous; all the enclosed internervular paired spots very much enlarged and (with the exception of 1st and 2nd pairs which are creamy-whitish) of the fulvous ground colour. UNDER SIDE.—Fulvous area much as on upper-side, but apical and hind-marginal border of fore-wing ochre-yellow instead of fuscous, and a rather wide basal space of hind-wing, from costa to inner margin, pale yellowish. *Fore-wing*: fuscous costal border in cell inferiorly better defined than on upper side, and extra-cellular discal fuscous irroration closer and darker. *Hind-wing*: pale yellowish basal space extending to extremity of cell, slightly irrorated with fulvous about base, along ordinary dark cellular longitudinal streaks, and on outer edge; succeeding it a ferruginous-fulvous discal band, very narrow costally but widening greatly to inner margin, externally blending with the ill-defined inner edge of the hind-marginal border, which is of a slightly greyish-ochreous, with its enclosed paired spots faint and blurred, but enlarged and coloured as on upper side.

This remarkable and most interesting form of the highly polymorphic ♀ of the *tibullus* sub-species of *P. dardanus* is in the Hope Department, and has been most kindly entrusted to me for description by Prof. Poulton. This, the type of the new form, bears the following record :—"1893, Nairobi. C. F. Elliot captd. Pres. 1906"; and it was presented to the Hope Department by Mr. E. A. Elliott, F.E.S., brother of the captor. It quite unmistakably mimicks the *dorippus*-form of *Danais chrysippus* so numerous in British East Africa. One was led to expect as not improbable the discovery of such a form of the ♀ *Papilio* from the fact that in all the continental-African races of *P. dardanus* in which the *trophonius*-form of ♀ occurs a variation has been met with presenting a partly or wholly fulvous instead of white sub-apical bar in the fore-wing, and so in some measure approximating to the *D. dorippus* coloration.* But the non-existence in Western and great rarity in Southern Africa of the *dorippus*-form of *D. chrysippus* rendered it very unlikely that the ♀ *Papilio* in those regions would include any close mimicry of that form, and induced the surmise that if this mimicry did exist, it would be found in that part of the *Papilio's* range where the *dorippus*-form equalled or exceeded in number the typical form of *D. chrysippus*. This view has now been verified by the discovery in British East Africa of the ♀ *Papilio* above described, in which the likeness to *dorippus* is gained by the extension and confluence of all the rufous-fulvous areas and minor markings, and the consequent diminution and suppression of the ordinary fuscous ground colour.

While it is observable that this likeness is not nearly so exact—especially in respect of the under side—as that exhibited by the ♀ *Diadema* (*Hypolimnas*) *misippus*, Linn., yet the fulvous tint is so very close to that of *dorippus* from the same district, and has so far invaded and occupied the hind-marginal borders, that the mimetic effect in life must be great. The resemblance to *dorippus* is in the example under notice so very much more advanced than in any other specimen of the ♀ *Papilio* known to me, that it would not be surprising if individuals still more accurately resembling the model should be found to exist

* See my note on this point as regards the Western and Southern races of the *Papilio* in "S. Afr. Butt.," iii, p. 252 (1889). Cf. Poulton, Trans. Ent. Soc. Lond., 1906, p. 290.

within the range of this Danaine's predominance or prevalence.

Everywhere exceptionally productive in differing forms and intermediate variations, the ♀ *P. dardanus* is surpassingly protean, as the smaller-sized sub-species *polytrophus*, in its modifications in the elevated interior of British East Africa, especially on the Kikuyu and other "Escarpments" immediately north and south of the equator. There, as Prof. Poulton has ably demonstrated,* it is possible to trace, with the aid of the many still existing gradations, the highly probable derivation of the more prominent mimetic forms from the primitive *trimeni*-form which is comparatively so little divergent from the male coloration and pattern. The transitional series from *trimeni*,—through (1) *hippocoon* and the partly fulvous-coloured linking variations between *trimeni* and *trophonius*; (2) those between *hippocoon* and *trophonius*; and (3) those between *trophonius* and *dorippoides*—well exemplified by the wholly fulvous-marked *trophonius* described by Prof. Poulton (l. c., p. 290);—constitutes a most striking and convincing illustration of the action of natural selection in the evolution of multiform mimetic adaptation within the limits of one sex only of a single species.

* Trans. Ent. Soc. Lond., 1906, pp. 283–298.

Explanation of Plates XXVI–XXIX.

[*See Explanation facing the* Plates.